**Fishy Frequencies**

**Purpose**

Understanding natural selection can be confusing and difficult. People often think that

animals consciously adapt to their environments - that the peppered moth can change its

color, the giraffe can permanently stretch its neck; the polar bear can turn itself white - all

so that they can better survive in their environments.

In this lab you will use fish crackers to help further your understanding of natural

selection and the role of genetics and gene frequencies in evolution.

**Background:** Facts about the “Fish”

1) These little fish are the natural prey of the terrible fish-eating sharks - YOU!

2) Fish come with two phenotypes - gold and brown:

a) gold: this is a recessive trait (ff)

b) brown: this is a dominant trait (F\_)

3) **In the first simulation**, you, the terrible fish-eating sharks, will randomly eat

whatever color fish you first come in contact with. (There will be no selection.)

4) **In the second simulation**, you will prefer to eat the gold fish (these fish taste yummy

and are easy to catch) you will eat ONLY gold fish unless none are available in which

case you resort to eating brown fish in order to stay alive (the brown fish taste salty, are

sneaky and hard to catch).

4) New fish are born every “year”; the birth rate equals the death rate. You simulate

births by reaching into the pool of “spare fish” and selecting randomly.

5) Since the gold trait is recessive, the gold fish are homozygous recessive (ff). Because

the brown trait is dominant, the brown fish are either homozygous or heterozygous

dominant (FF or Ff).

**Materials**

• Fish crackers – brown and gold

**Procedure 1**

1) Get a random population of 10 fish from the “ocean.”

2) Count gold and brown fish and record in your chart; you can calculate frequencies

later.

3) Eat 3 fish, chosen randomly, without looking at the plate of fish

4) Add 3 fish from the “ocean.” (One fish for each one that died). Be random. Do NOT

use artificial selection.

5) Record the number of gold and brown fish.

6) Again eat 3 fish, randomly chosen

7) Add 3 randomly selected fish, one for each death.

8) Count and record.

9) Repeat steps 6, 7, and 8 two more times.

10) Provide your results for the class. Fill in the class results on your chart.

**Procedure 2:**

1) Get a random population of 10 fish from the “ocean.”

2) Count gold and brown fish and record in your chart; you can calculate frequencies

later.

3) Eat 3 gold fish; if you do not have 3 gold fish, fill in the missing number by eating

brown fish.

4) Add 3 fish from the “ocean.” (One fish for each one that died). Be random. Do NOT

use artificial selection.

5) Record the number of gold and brown fish.

6) Again eat 3 fish, all gold if possible.

7) Add 3 randomly selected fish, one for each death.

8) Count and record.

9) Repeat steps 6, 7, and 8 two more times.

10) Provide your results for the class. Fill in the class results on your chart.

**Part 1 (Without Selection)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **My Data** | | **Class Data** | |
| Generation | gold | brown | gold | brown |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |

**Part 2 (With Selection)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **My Data** | | **Class Data** | |
| Generation | gold | brown | gold | brown |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |

**Questions**

1. In either simulation, did your allele frequencies stay approximately the same over

time? If yes, which situation? What conditions would have to exist for the

frequencies to stay the same over time?

1. Was your data different from the class data? How? Why is it important to collect

class data?

1. With selection, what happens to the allele frequencies from generation 1 to

generation 5?

1. What process is occurring when there is a change in allele frequencies over a long

period of time?